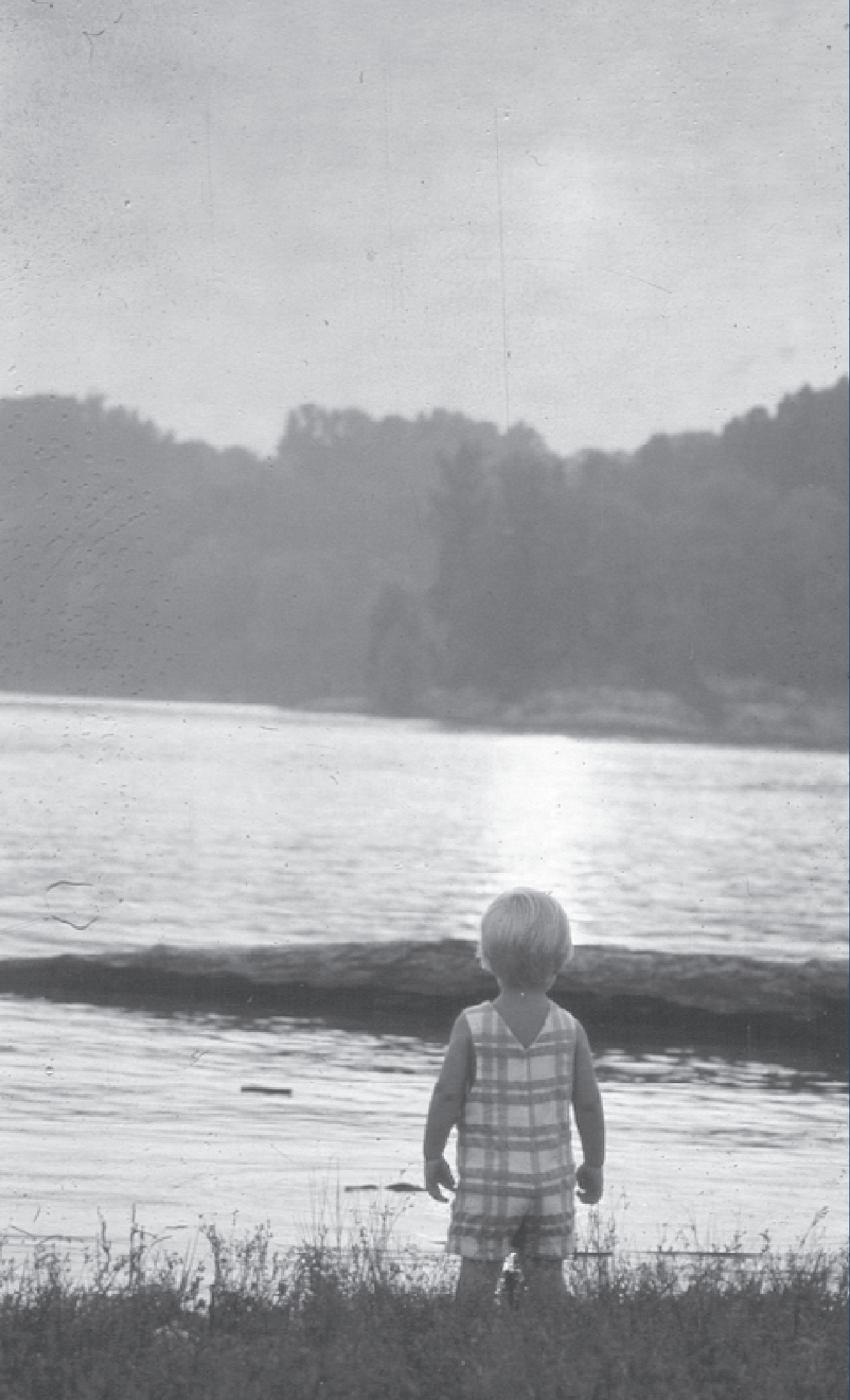


Overview



1998-99 State of Kentucky's Environment:

Overview and Key Findings

As Kentucky enters the 21st century, the state can look back on many environmental accomplishments. Our air is safer to breathe, many waterways are cleaner, and we have made great strides in reducing toxic chemical risks—all while our economy has grown and prospered. But the state still has a long way to go to restore environmental integrity and enhance the quality of life for all Kentuckians.

The next millennium provides us with a unique opportunity to reflect on just how far Kentucky has come in protecting our environment. The *1998-99 State of Kentucky's Environment: Charting a Path of Progress into the Next Century* continues the efforts of the Environmental Quality Commission over the past six years to chart environmental improvements as well as assess the many problems that still confront the Commonwealth. Indicators in this report track the state's progress in safeguarding our drinking water supplies, protecting water and air quality, promoting proper waste management, and reducing toxic risks.



“We need water real bad. We’re not asking for an arm and a leg, just good clean water.”

Jerry Stacy, father of four
speaking about well pollution problems in Rowdy, Ky.
The Courier-Journal, August 16, 1998

Safe Drinking Water

Generally speaking, drinking water supplied by the 730 water systems to three million Kentuckians is safe for consumption. But recent contamination incidents, detailed in the following newspaper headlines, point to how vulnerable our public and private drinking water supplies are:

- *3 small Perry communities just want “good clean water”* (Herald-Leader, 8/16/98).
- *City’s water supply tainted by nematodes* (State Journal, 9/10/98).

- *Water troubles close schools, businesses* (Courier-Journal, 9/26/98).

Public fears about the quality of public drinking water supplies have led many to question the safety of their tap water. A recent USA TODAY/CNN/Gallup poll found 47% of respondents won’t drink tap water.

And some of these concerns may be well founded. A soon-to-be-released report by the U.S. Environmental Protection Agency estimates that 230,000 people get sick each year from drinking contaminated drinking water, and 50 people die as a result.

Drinking Water at a Glance (1997)

Kentuckians served by public water systems: 3,075,623
Households served by public water systems: 82%
Number of public drinking water systems: 730
Violations of drinking water regulations: 687
public systems with violations: 231 (33%)
percent of violations occurring at small systems: 87%
most common violation: monitoring/reporting (48%)
systems with violations of MCL* standards: 32 (4%)
systems in significant noncompliance: 13
Drinking water systems assessed fines: 10 (\$16,950)
Boil water notices and advisories issued: 236
Kentuckians dependent on private water: 700,000
Private water wells with potential contamination**:
58% of 2,217 wells voluntarily tested
Drinking water infrastructure needs: \$2.22 billion
Per capita state expenditures on drinking water***: 67¢
*Maximum Contaminant Levels set to protect public health.
** Wells that tested positive for total fecal coliform.
***Based on Ky. Div. of Water expenditures FY 1997-98.

A Centers for Disease Control and Prevention study, however, suggests illnesses are closer to one million with 900 deaths a year. Getting accurate measures of illnesses caused by bad drinking water is difficult since most of the common symptoms of waterborne illness, such as nausea and diarrhea, usually get blamed on the stomach flu or contaminated food.

Public Drinking Water Quality. So how safe is Kentucky's drinking water? Trends reveal that violations of drinking water standards are declining. Five large public drinking water systems had few violations of Safe Drinking Water Act regulations during the past five years. These five systems serve an estimated 38% of the state's population. But if you get your water from a small system, there may be cause for concern. The vast majority of violations of Safe Drinking Water regulations occur at smaller plants. Data reveal that 189 systems, each serving 3,000 people or fewer, accounted for 90% of the drinking water violations cited in Kentucky during 1997. More than 38,000 people were at risk that year from systems with persistent violations of Safe Drinking Water Act rules.

While drinking water violations are declining, the number of boil water advisories has increased dramatically during the past ten years. For example, in 1987 eleven boil water advisories were issued compared to 227 in 1997, a record number in the state. The rise is attributed to system operators doing a better job monitoring water quality and responding to potential contamination due to water line breaks.

Private Drinking Water Quality. Kentuckians who rely on private water sources are at far greater risk from drinking contaminated water. An estimated 700,000 Kentuckians depend on wells, cisterns, and other private sources for drinking water.

Private supplies of water are not required to be tested, so assessing quality is difficult. However, water wells tested upon request by local health departments reveal that of the 2,217 private water wells sampled in 1997, 58% tested positive for total fecal coliform—an indicator that the water may be polluted by disease-causing bacteria. This does not necessarily mean that the groundwater source is contaminated but may be the result of poorly constructed or maintained wells.

Challenges Ahead. Governor Patton created the Water Resource Development Commission to ensure that every Kentuckian has access to potable water by the year 2020. Meeting this goal will require a significant investment in both treatment plants and distribution systems. A new state drinking water

revolving loan fund capitalized with an initial federal grant of \$12.5 million should help but will fall well short of the \$2.2 billion needed to adequately treat public drinking water. Ensuring the proper construction and maintenance of water wells, upon which many rural Kentuckians depend for drinking will also remain an ongoing need in the state.

Improving compliance of small water plants as well as implementing the 1996 Safe Drinking Water Act Amendments are among the challenges facing the state. New federal and state rules will focus on reducing health risks associated with microbiological contaminants (*Cryptosporidium* and *Giardia*), disinfection by-products, and pesticides in drinking water.

Protecting drinking water sources from pollution is also mandated under the act's amendments. Kentucky was the first state in the nation to win approval by the U.S. EPA in 1998 for its Source Water Assessment and Protection Program. Under the program, each water supplier will be required to assess the vulnerability of its drinking water source to contamination and also plan for long-term water supply needs.



Protecting Water Supplies: One Kentucky Community's Effort

The city of Georgetown is among several communities in Kentucky working to protect their drinking water supplies.

The Georgetown Municipal Water and Sewer Service provides drinking water to 20,000 customers, 80% of which is supplied by Royal Springs. The spring is one of the largest in the region with a recharge area of about 25 square miles, of which 80% is located in Fayette County.

Officials in Georgetown have worked together with Fayette and Scott county officials to identify and map potential contaminant sources in the spring's recharge area and develop emergency spill response procedures. The final phase of the wellhead protection plan is underway and includes regulatory and nonregulatory measures to protect the aquifer.

Some 445 communities and more than half a million Kentuckians depend on groundwater for public drinking water supplies. Currently, 30 systems are in the process of developing wellhead protection plans to protect this important resource.



“It’s time that we as a state face the facts that water provides life, health and jobs and that, without a supply of clean water, we have communities that are unhealthy — both environmentally and economically.”

James E. Bickford, Secretary
Natural Resources and Environmental Protection Cabinet
Herald-Leader Readers’ Views, April 28, 1998

Restoring Waterways

Over the past 25 years Kentucky has seen significant improvements in restoring water quality. But trends reveal nearly one-third of the 6,363 miles of waterways monitored by the state during 1997 were still impaired by pollution. And one out of four public lakes cannot be fully used for swimming, fishing, or as a drinking water source due to pollution.

Water Quality of Rivers and Streams. Kentuckians enjoy the benefits of an estimated 89,461 miles of rivers and streams. A review of the water quality in the state’s 13 river basins reveals a number of waterways remain impacted by pollution. For example, the 664-mile stretch of the Ohio River bordering Kentucky, while cleaner than it was a decade ago, still can only partially meet its fishable and swimmable goals. Some of the most polluted waterways include the North Fork of the Kentucky River, the Upper Cumberland River, and the Licking River where swimming advisories have been issued over the past several years due to human health risks associated with bacteria in the water. The state has also declared urban waterways off limits to swimming, especially after heavy rainfalls, due to bacteria in the water.

Agriculture, mining, and sewage treatment plants remain the greatest sources of water pollution in the Commonwealth. Disease-carrying bacteria, often associated with untreated or poorly treated animal and human waste, are the most common pollutants

detected in monitored waterways.

Water Quality of Lakes. Kentucky’s lakes provide recreational benefits and also serve as a source of drinking water for seven communities. Trends reveal a general improvement in the number of lakes impacted by pollution. Currently, one in four public lakes assessed cannot meet its designated uses for swimming, fishing or as a drinking water source. Agriculture remains the leading source of lake pollution, impacting one-third of the 33 impaired public lakes.

Fish Consumption/Fish Kills. Pollution also impacts aquatic life by destroying habitat and contaminating fish. Consumption of contaminated fish poses a particular risk to children and women of childbearing age, as well as to those who fish for food or sport. Six fish consumption advisories remain in effect in Kentucky. PCBs, a probable human carcinogen banned from use in 1977, is the contaminant of concern in five of the six advisories.

Trends also show a decline in fish kill incidents reported in the state. During 1997, 16 incidents killed 16,000 fish along 17.5 miles of streams.

Groundwater Quality. Groundwater supplies an estimated 1.7 million Kentuckians with drinking water. Efforts are underway to determine the quality of groundwater in Kentucky. Preliminary analysis of data from the state’s groundwater monitoring network reveals varying levels of pesticides and other pollutants in water wells and springs.

Wastewater Treatment. An estimated 56% of the state’s households have their sewage piped to wastewater treatment plants. These plants have prevented

Water Quality at a Glance (1997)

Miles of waterways : 89,461
miles monitored : 6,363
percent of monitored waterways polluted: 32%
Sources of pollution in monitored waterways:
agriculture: 20% coal mines*: 19%
sewage treatment plants: 17%
land disposal/septic tanks: 12% other: 32%
Waterways with fish consumption advisories: 851 miles
Public lakes assessed for pollution: 122
public lakes with pollution problems: 33
Number of wastewater treatment plants: 3,089
percent with one or more violations: 66%
Percent of households on septic systems: 44%
On-site septic system permits issued (FY 97-98): 17,285
Homes built each year with straight pipes or inadequate septic systems: 5,000 (estimate)
Per capita state expenditures on Clean Water**: \$3.13
*Active, inactive, and abandoned coal mine sites combined.
**Based on Ky. Div. of Water expenditures FY 1997-98.

millions of tons of raw sewage from entering waterways. However, poor operation of wastewater plants, primarily small package plants, contribute to water quality problems throughout the Commonwealth. During 1997, 2,048 (66%) of the 3,089 wastewater treatment plants had one or more violations of water regulations. While most of the 45,373 violations were monitoring or reporting infractions, 30% of the violations were for exceeding permit limits set to protect public health and the environment.

Millions of dollars of federal, state, local and private funds have been invested to improve sewage treatment. But Kentucky still needs \$3.2 billion over the next 20 years to meet municipal wastewater treatment needs, according to the 1996 Division of Water needs survey. And it is estimated that tens of millions of dollars are needed to address sewer overflows, which are common in most cities.

On-site Sewage Disposal. Many Kentucky households rely on on-site disposal systems to treat sewage. The Kentucky Department for Public Health issued 17,285 on-site septic system permits in Fiscal Year 1997-98. But the agency estimates that one in four new homes is illegally discharging sewage into waterways or has an inadequate septic system. A 1998 state law requiring an approved on-site sewage disposal plan prior to electric hookup for any new residence should help curb this problem.

Challenges Ahead. While Kentucky has made

progress in restoring water quality, critical threats remain including polluted runoff from farmlands, mine sites, and urban areas; sewage from straight pipes, failing septic systems, wastewater treatment plants, and sewer overflows; and emerging issues associated with animal feeding operations. Addressing these concerns will require state, regional, and local solutions including targeted enforcement strategies as well as expanded technical and financial assistance programs

Appropriate legislation, administrative regulations, and policies are also needed to promote the regionalization of wastewater and water supply infrastructure in order to expand and improve services. The formation of county or regional water and sewer districts is envisioned as the most effective means of accomplishing the goal of regionalization.

Developing and implementing water quality plans to control pollution from agricultural operations will remain a top state priority. Each farm and logging operation must prepare a plan by October 2001. The Kentucky Division of Conservation reports that 970 plans in 64 counties have been prepared to date.

Assessing the cumulative pollution impacts to waterways will also be the focus of the Kentucky Division of Water's *Watershed Initiative*. During the next several years, watersheds will be studied, and stakeholders will be involved in efforts to protect waterways.

Restoring a Waterway:

The North Fork of the Kentucky River

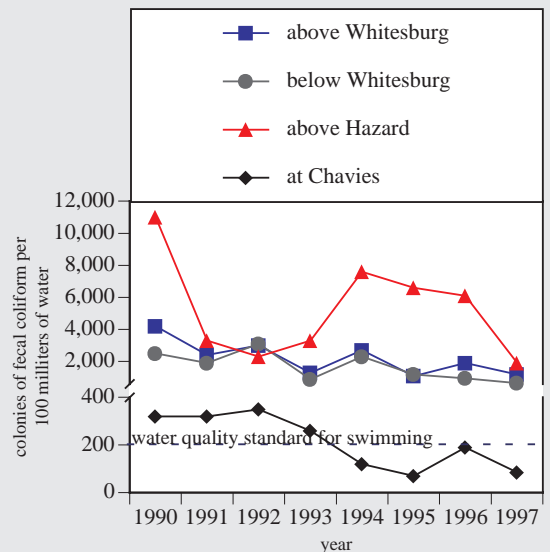
The North Fork of the Kentucky River is one of the most polluted waterways in Kentucky. But efforts are underway to clean up the watershed.

Failing wastewater treatment plants and illegal sewage discharges made the entire 163-mile length of the North Fork unsafe for swimming. A state enforcement strategy to bring wastewater treatment plants into compliance reduced the swimming advisories to 80 miles since 1993. Monitoring results from 1990 through 1997 show a decrease in fecal coliform pollution throughout the watershed.

But much more is needed to meet health-based water quality standards in the watershed. Failing septic tanks and straight pipe sewage discharges have proved to be a more difficult problem. Straight pipes have been illegal for decades, but local and state officials have been reluctant to prosecute offenders. A low-interest loan fund was recently established to help homeowners install approved septic systems in a 40-county area along the Kentucky River in hopes of tackling this tough problem.

A watershed initiative is also underway to focus local and state attention on water pollution problems in the Kentucky River watershed.

Bacteria Levels in the North Fork of the Kentucky River



Note: Water quality standard for full body contact is 200 fecal coliform colonies per 100 milliliters of water based on five samples collected within a 30 day period and calculated as geometric mean. Source: Ky. Division of Water



“At the local level, where the air meets our lungs, progress has continued consistently for several years. . . While we have made solid progress we must continue to improve air quality for the benefit of the health of our citizens and our economy.”

Adrian P. Freund, Director
Jefferson Co. Dept. of Planning and Environmental Mgmt.
The Courier-Journal, September 3, 1998

Clean Air

Nowhere have environmental improvements been so dramatic as in the area of air quality. Years of pollution controls on automobiles and at industrial plants have paid off in cleaner air across the Commonwealth. Since 1980, emissions have been reduced and improvements in air quality have been achieved. Despite that progress, much remains to be accomplished. For example, some 771,875 Kentuckians live in areas having air quality that, while significantly improved, still does not meet health-based ozone standards. Additionally, millions of pounds of toxic chemicals are released each year into the air, according to the Toxics Release Inventory.

Criteria Pollutants. Since 1980, Kentucky has witnessed declining concentrations of six criteria air pollutants—lead, nitrogen dioxide, sulfur dioxide, carbon monoxide, particulate matter and ground-level ozone. Some of these improvements have been more dramatic than others. For example, carbon monoxide air concentrations dropped by 51% between 1980 and 1997 while ground-level ozone air levels declined by 21%.

Improvement in air quality is paralleled in part by reductions of the emissions of pollutants from industrial sources. Between 1980 and 1997 statewide industrial emissions of sulfur dioxide, nitrogen oxide, carbon monoxide and volatile organic compounds

(excluding Jefferson County due to unavailability of data prior to 1990) dropped by 35%. Kentucky currently meets the National Ambient Air Quality Standards (NAAQS) for all of the criteria pollutants, with the exception of ground-level ozone.

Ground-Level Ozone. Kentucky has witnessed major improvements in reducing public exposure to ground-level ozone. For example, in Louisville there were 91 exceedances of the 0.12 parts per million (ppm) one-hour ozone standard from 1980 through 1997; 78 of those exceedances occurred prior to 1989 and only 13 in the past nine years. In the rest of Kentucky, there were 162 exceedances of the ozone standard between 1980 and 1988, 35 were recorded during the past nine years.

Improvements in reducing public exposure to ozone are not achieved directly since this pollutant is not actually emitted in significant amounts. Rather ground-level ozone is formed through reactions of nitrogen oxides (a by-product of energy combustion) and volatile organic compounds (from evaporating solvents, inks, coatings, fuels) in the presence of sunlight. The health effects from exposure to ozone

Air Quality at a Glance (1997)

Number of days with one or more ozone pollution exceedance (statewide): 5

Counties not meeting one-hour 0.12 ppm ozone standard: 3

Regulated sources of air pollution: 2,668
major sources (emitting 100 tons or more/yr.): 290

Sulfur dioxide emissions
mobile*: 31,723 tons area*: 57,201 tons
regulated point source**: 656,900 tons

Nitrogen oxide emissions
mobile*: 217,213 tons area*: 74,728 tons
regulated point sources**: 398,800 tons

Carbon monoxide emissions
mobile*: 1,143,730 tons area*: 160,227 tons
regulated point sources**: 78,100 tons

Volatile organic compounds emissions
mobile*: 131,155 tons area*: 147,697 tons
regulated point sources**: 67,900 tons

Airborne particulates (PM-10) emissions
mobile*: 139,605 tons area*: 164,577
regulated point sources**: 26,000 tons***

Air quality violations cited: 997

Public complaints: 2,275

complaint types***: odor - 39%; burning - 38%;
dust - 22%; other - 11%

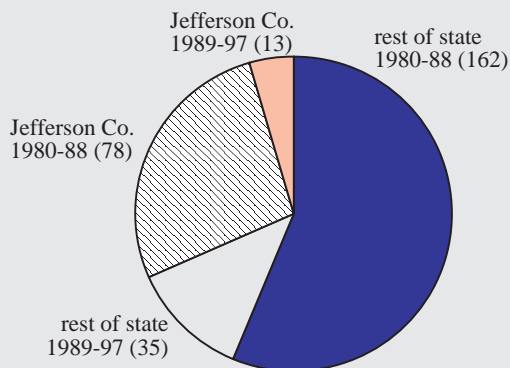
Per capita state expenditures on air quality****: \$2.56
*U.S. EPA data.

**Div. for Air Quality, Jeff. Co. Air Poll. Control Dist. data.

***Excludes Jefferson County, data not available.

****Based on Ky. Div. Air Quality expenditures FY 1997-98.

Exceedances of Ozone Standard*



*One-hour 0.12 ppm standard. Source: Ky. Div. Air Quality

can be serious, causing reduced lung function, exacerbation of asthma, and other respiratory diseases. An estimated 20% of the state's population live in Jefferson and portions of Bullitt and Oldham counties which are in a nonattainment region currently experiencing problems meeting the 0.12 ppm one-hour ozone standard.

In the Louisville area, a Vehicle Emissions Testing program has been in operation since 1984 to help curb ozone pollution. In 1998, a tougher Vehicle Emissions Testing program was initiated in the county with the intent of reducing vehicle emissions another two million pounds per year. Despite these efforts, as well as a reduction of industrial ozone precursor emissions by 45% during the past seven years, Louisville has failed to meet the Nov. 15, 1998, deadline to comply with the one-hour ozone standard. Not meeting the standard could result in Louisville being reclassified from "moderate" to "serious" which carries stricter requirements curtailing economic growth. The Kentucky Division for Air Quality and the Jefferson County Air Pollution Control District are working with the U.S. EPA to formulate strategies to prevent this from occurring.

In 1997 the U.S. EPA determined that the existing air quality standard for ozone was not sufficient to protect human health with a reasonable margin of safety. The agency revised the ozone standard from 0.12 ppm to 0.08 ppm. Additionally, the new standard is averaged over eight hours rather than the highest daily one-hour reading used by the existing standard.

Sulfur Dioxide. Recognized as a precursor to acid rain and a public health threat, efforts to control sulfur dioxide (SO₂) have been ongoing for several years. The NAAQS for sulfur dioxide is being met throughout Kentucky, although the southern portion of Boyd County has not yet been redesignated as attainment.

In Kentucky, 91% of the 656,900 tons of industrial SO₂ emissions were emitted by power plants. The Clean Air Act Amendments of 1990 set a cap on SO₂ emissions that can be emitted by large sources, such as power plants, at about 40% of the amount released in 1980. As a result, total sulfur dioxide emissions released by the 23 power plants in Kentucky declined from 1.49 million tons in 1980 to 599,049 tons in 1997—a 60% drop. This was accomplished while the amount of coal burned at power plants increased 22.8%, from 31.1 million tons in 1980 to 38.2 million tons in 1997. A second round of SO₂ reductions will take place in the year 2000.

Nitrogen Oxides. High levels of nitrogen oxides (NO_x), a brownish mixture produced by fossil fuel combustion, are known to impair human health and contribute to the formation of acid rain and ground-level ozone. All of Kentucky is currently meeting the NAAQS for nitrogen dioxide.

However, indicators reveal that industrial emissions of nitrogen oxides from regulated sources have increased in Kentucky—from 334,600 tons in 1990 to 398,800 tons in 1997. Power plants accounted for 84% of the industrial NO_x emissions. Nitrogen oxide emissions from power plants increased 17.4% between 1980 and 1997—from 286,560 tons to 336,537 tons. While increasing emissions have not caused violations of the NO_x standard, they may be increasing acid deposition, regional haze, or ground-level ozone. In response to scientific evidence of long-range transport of ozone and its precursors, the U.S. EPA is calling for massive reductions in NO_x emissions throughout the eastern U.S.

Carbon Monoxide. Carbon monoxide is an odorless gas primarily emitted in the exhaust of vehicles. Trends reveal that air concentrations of carbon monoxide continue to decline in Kentucky due to pollution controls on automobiles. For example, levels fell by more than 50% between 1980 and 1997. All regions of the state currently meet the carbon monoxide standard.

Particulates. Particulates are small particles of dust, soot, liquids, and dirt in the air. These materials can become embedded in the lungs affecting breathing and lung functions. Particulates have been linked to lung cancer and premature death. Kentucky remains well below the federal standard for particulates less than 10 microns in diameter.

In 1997, the U.S. EPA issued new standards for particulates less than 2.5 microns in diameter. New PM_{2.5} particulate monitors located in 18 counties will begin measuring for this pollutant in 1999.

Indoor Air Pollution. The U.S. EPA ranks indoor air pollution among the top five environmental risks to public health. Indoor air can be two to five times more polluted than outside air. There are many sources of indoor air pollution, including radon gas. Radon gas occurs naturally and can enter homes through cracks in foundations. Data reveals that 40% of the 27,977 homes tested in Kentucky by one company for radon gas had levels above the health advisory limits.

Ozone-Depleting Chemicals. Data from the 1996 Toxics Release Inventory reveal that 21 companies in Kentucky released 7.25 million pounds of 14 ozone-depleting chemicals. Kentucky ranked top in the nation that year in on-site releases of chemicals associated with the destruction of the earth's stratospheric ozone layer.

Challenges Ahead. While most regions of Kentucky meet air pollution standards, achieving the new standards for ground-level ozone and particulates will pose significant challenges in the Commonwealth. Based on current data, it is estimated that 12 Kentucky counties have a very high probability of not meeting the new ozone standard. Four additional counties will likely have problems meeting the new ozone standard.

Power plants and other pollution sources will be required to reduce nitrogen oxide emissions under a new federal rule designed to reduce ground-level ozone. The U.S. EPA estimates that the new rule will reduce NO_x emissions by 1.1 million tons in the

eastern U.S. by the year 2003. Kentucky will be responsible for cuts of about 75,000 tons. It is expected that coal-burning power plants in Kentucky will be required to cut NO_x emissions by 66% to meet this goal. Other sources will be called upon to reduce NO_x emissions as well.

Kentucky and other states also must begin to monitor and develop strategies to achieve the new PM_{2.5} particulate matter standard. The new standard for particulates is directed toward particles having a diameter of 2.5 microns or less. These are the very smallest particles contaminating the air. Many of these very fine particles are not emitted directly into the air, but rather condense from gaseous emissions. Nitrogen oxides, for example, can condense into nitrates and become a particulate. Nitrogen oxide emissions also contribute to regional haze. The many impacts of NO_x emissions, coupled with the huge volume of those emissions, allows multiple health and environmental benefits from their control. New PM_{2.5} monitors will be located near population centers and large combustion sources in 18 counties and will begin operations in 1999.

Other air quality challenges facing Kentucky include integrating risk assessment and risk management into the control of toxic and hazardous air pollutants, finding effective strategies for reducing indoor air pollution, and encouraging pollution prevention at the source.

Twelve Counties Will Have Trouble Meeting New Ground-Level Ozone Standard

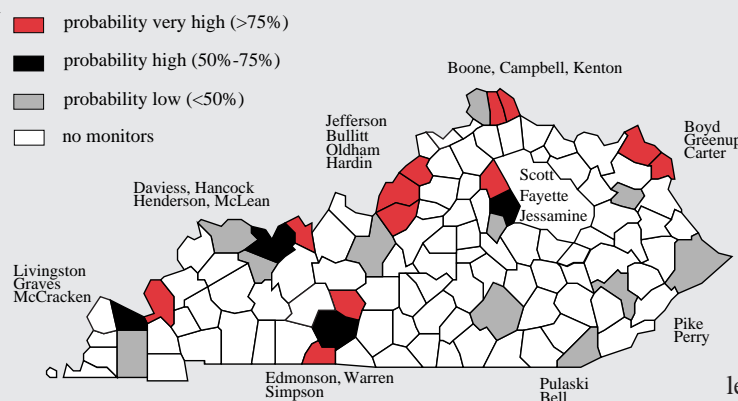
Several Kentucky counties may have difficulty meeting a new stricter ground-level ozone pollution standard. Preliminary determinations indicate 12 counties will likely be in violation of the new 0.08 parts per million (ppm) eight-hour ozone standard and four counties will be close to exceeding the standard, based on 1995-97 monitoring data. However, final determinations will not be made until the year 2000, based on 1997-99 monitoring data.

The new national 0.08 ppm standard is designed to reduce health risks associated with ozone—a main ingredient of smog. Ozone can irritate the lungs, and cause breathing difficulties, especially in children and the elderly and people with respira-

tory problems such as asthma. The new rule will use the average ozone reading over an eight-hour period instead of the existing highest daily one-hour reading. Averaging ozone over a longer period of time can provide a better assessment of health impacts, since extended exposure to ozone at low levels can be more harmful than short-term exposure at high levels.

The new ozone standard will not have to be met for at least seven to 12 years. It is hoped that a required national cutback of industrial emissions of nitrogen dioxide by the year 2007, a precursor to smog, will help counties meet the new ground-level ozone standard.

Probability of Kentucky Counties Not Meeting the New Ozone Standard (based on historical monitoring)





“Kentucky is such a beautiful state, and when you take in all that scenery, then see a bottle just thrown to the side of the road, that kind of ruins it.”

Amber Reed, Senior, Estill County High School
Speaking in support of a Kentucky bottle bill
Herald-Leader, January 6, 1998

Waste Management

Kentuckians enjoy a great diversity of products—from soda to disposable diapers. But there are hidden costs of our consumption of such a variety of goods, namely the production of household trash and hazardous waste. Kentuckians produce a great amount of garbage—16.7 million pounds a day to be exact. And millions of tons of hazardous waste are produced every year as by-products of manufacturing processes.

Solid Waste. Managing Kentucky's solid waste has long been a difficult task, but in the past decade the Commonwealth has made gains in ensuring its proper and safe disposal. For example, 56 substandard municipal solid waste landfills were closed after the passage of a 1991 state law requiring stricter construction and operating standards. Twenty-five state-of-the-art regional municipal solid waste landfills are currently permitted to provide 18.95 years of capacity.

All counties have enacted garbage collection ordinances, however, only 20 require mandatory participation. The number of Kentuckians participating in garbage collection has reached an all-time high in 1997, at 1.15 million households. It is presently not known how the remaining 25% of the state's households are disposing of their garbage since there is no reporting mechanism in place to track garbage disposal by those not participating in door-to-door collection.

While the exact amount of garbage illegally dumped is not known, thousands of open dumps attest to the fact that it remains a problem throughout the state. In 1996, the Natural Resources and Environmental Protection Cabinet initiated an Open Dump Campaign to stop illegal dumping. During 1997, county officials issued 7,806 open dump citations and cleaned up 3,043 open dumps at a cost of \$4.1 million. State inspectors also issued 1,590 notices of violation that resulted in 490 dumps being cleaned up since 1997. A new tire amnesty program, to be held in every county during the next three years, should also help to clean up waste tire piles across the Commonwealth.

State, local, and individual efforts to recycle waste resulted in the diversion of 1.5 million tons of aluminum, newspapers, cardboard, paper, glass, and plastic materials away from landfills in 1997. The Kentucky Division of Waste Management estimates that 28% of the waste produced in the state is recycled. This is an improvement since 1990 when the recycling rate was 17%.

Hazardous Waste. During 1996 (the most recent year state data is available), 409 large quantity

Waste Management at a Glance

Solid waste generated per person (1997): 4.3 lbs/day
Waste disposed at MSW landfills (1997): 5.41 million tons
Households participating in curbside garbage collection (1997): 1.5 million (75%)
Dump cleanups reported by counties (1997): 3,043
cost of open dump cleanups : \$4.1 million
Materials collected for recycling (1997): 1,530,823 tons
Hazardous waste generated (1996): 17.8 million tons*
Hazardous waste imported into Ky. (1996): 79 tons
Hazardous waste exported out of Ky. (1996): 174 tons
Contaminated waste sites (cumulative to date) (1997)
waste sites investigated: 1,288
waste sites with contamination: 1,255
waste sites cleaned up: 830
Federal Superfund sites (1997): 20
sites remediated: 7
Kentuckians living within 4 miles of a federal Superfund site: 290,155
Registered underground storage tanks (1998): 41,000
active tanks : 19,436
tanks closed: 23,000
active tanks not meeting standards (March 1999): 913
tank sites with contamination: 730
tank sites cleaned up: 637
*Per capita expenditures on waste management**: \$5.16*
**Produced by large quantity generators.*
***Based on Div. of Waste expenditures (FY 1997-98).*

generators in Kentucky reported producing 17.8 million tons of hazardous waste.

Hazardous wastes are created as by-products of manufacturing processes. In addition, a significant amount of hazardous waste is generated during the remediation of spills as well as by service industries such as automotive repair. Federal and state rules require that hazardous waste be managed from the moment it is generated until it no longer poses a threat to human health or the environment. In Kentucky, 17.4 million tons of hazardous waste produced by major generators was considered exempt waste—primarily corrosive wastewater, the bulk of which was treated on-site to render it nonhazardous. Another 400,000 tons of hazardous waste generated in 1996 was classified as managed waste. Most of this waste required more sophisticated treatment or disposal. Currently, there are 36 facilities permitted in the state to treat, store, and dispose of hazardous waste.

Enforcing hazardous waste rules is a primary means to ensuring its safe management. Hazardous waste inspections dropped from 1,390 in 1996 to 532 in 1997, and violations cited fell from 146 in 1996 to 38 in 1997. The decline is attributed to a shift in enforcement priorities to open dumps and leaking underground storage tanks.

Contaminated Waste Sites. Each year hundreds of potential contaminated waste sites are discovered. These sites pose significant threats to our land, waterways, and drinking water supplies. To date, 1,898 potential contaminated waste sites have been identified in Kentucky. Of the 1,288 sites investigated, 1,255 have confirmed contamination, and 830 sites have been remediated by the state or responsible parties. Kentucky has also seen some progress in the cleanup of federal Superfund sites. Of the 20 Superfund sites, seven have had remediation completed and the sites are in long-term maintenance.

The Kentucky Division of Waste Management recently approved an initiative to promote the voluntary cleanup of waste sites. Through cooperative partnerships, the state allows willing parties to conduct site investigations and cleanups with state oversight. The intent of the program is to limit liability and spur cleanup in order to return waste sites to productive use. One site is presently under consideration for the voluntary cleanup program.

The state is also working with Louisville to clean up contaminated urban sites known as brownfields. The U.S. General Accounting Office estimates that there are 400,000 to 500,000 brownfield sites across the United States. Louisville has been selected as a

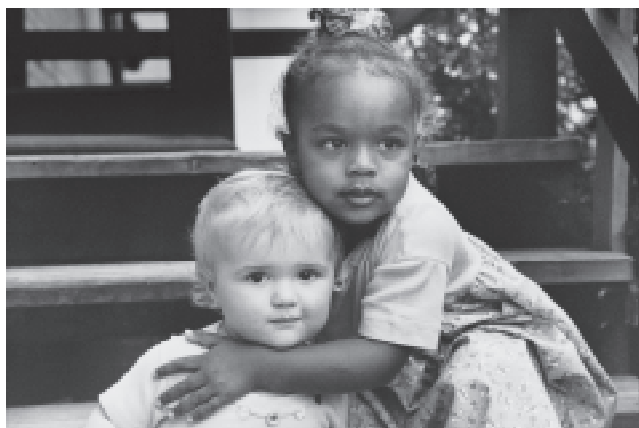
national pilot project for brownfields revitalization. The goal of the project is to facilitate assessments and environmental cleanups of idled industrial land and to return it to productive uses. Site characterization activities have been completed at two brownfield properties in Louisville's heavy industry corridor.

Underground Storage Tanks. Leaking petroleum storage tanks have the potential to contaminate the environment. Since the Kentucky underground storage tank program began in 1986, 44,937 tanks have been registered and 27,688 have been removed or closed to prevent groundwater or soil contamination. Long-term contamination problems have been confirmed at 730 tank sites during the past 12 years, and 637 have been cleaned up or are involved in corrective action or routine monitoring. The rest of the sites are under investigation.

Challenges Ahead. The legacy of improper waste management can be found in almost every Kentucky community. Strong and consistent enforcement of the state's solid and hazardous waste laws and regulations are necessary to protect public health and prevent environmental degradation.

Efforts to strengthen participation in garbage collection programs and prevent the illegal dumping of waste will require the continued commitment of state and local officials. And cleaning up hundreds of contaminated waste sites will cost millions of dollars. The principal source of monies to cleanup contaminated waste sites, the Kentucky Hazardous Waste Management Fund, is slated to expire in the year 2000. The Hazardous Waste Management Fund, established in 1981, is financed through a fee on hazardous waste generators and collects about \$2.2 million a year to help finance the clean up of contaminated waste sites in Kentucky. The renewal of this fund is urgently needed if Kentucky is to continue to make headway in remediating these sites.

Meeting the 1998 federal underground storage tank requirements for leak and spill detection will result in the state overseeing the closure of hundreds of tanks. As of March 24, 1999, 7% of the registered active tanks in Kentucky (913) did not meet the 1998 standards and must either close or upgrade their facilities. There are also hundreds of thousands of unregistered underground storage tanks that pose a threat to the environment. A number of unregistered tanks are discovered each day at old or abandoned gas stations by Kentucky Division of Waste officials. Many of these old tanks have leaked and contaminated soil and water resources.



“Many leading health experts suspect that toxins found in our environment may very well play a role in the growing incidence of certain childhood cancers.”

Carol Browner, Administrator
U.S. Environmental Protection Agency
Conference on Preventable Causes of Childhood Cancer
September 15, 1997

Reducing Toxic Risks

Some 75,000 synthetic chemicals have been registered for commercial use during the past 50 years. And an estimated 2,000 new chemicals are introduced annually. While these chemicals form the basis for many of the products we use every day—from toothpaste to gasoline—their impact on the environment and public health is just beginning to be uncovered. Cancer rates among children have been rising for decades (an increase of an average of 1% annually, according to the National Cancer Institute). Leading health experts strongly suspect that toxins in the air, food, dust, soil, and drinking water may very well play a role. Today, a newborn child faces a risk of about one in 600 of contracting cancer by age ten.

Toxic products used in the home can be a health risk as well. In 1997, the Kentucky Regional Poison Center received 47,247 calls, 65% of which involved small children. Exposure to cleaning products, industrial chemicals, pesticides, and hydrocarbons resulted in 8,953 calls to the Poison Control Center.

Toxic Chemicals. Managing toxic chemicals to reduce public health and environmental risks has received greater national attention during the past decade. The federal Emergency Planning and Community Right-To-Know Act was passed in 1986. A key component of the act is the Toxics Release Inventory (TRI) which requires certain manufacturers that employ ten people or more to self-report to the public the generation and release of 600 toxic chemi-

cals into the air, water, and land.

During 1996, the most recent year for which data is available, 429 facilities in Kentucky reported generating 577 million pounds of TRI toxic chemical by-products. Most of these toxic chemicals generated—about 80%—were treated or recovered at the site of generation. About 8% (47.4 million pounds) of the 577 million pounds of toxics generated during 1996 was released directly into the environment, with 87% (38 million pounds) being released to the air. A review of the top five TRI chemicals released by volume to the environment in Kentucky reveals that all, at certain levels and doses, can cause acute toxicity from a single exposure, three can impair development and reproductive functions, and one is a possible human carcinogen.

EQC also reviewed the generation of 17 TRI “priority” toxics considered highly toxic, cancer-causing, or used in great volumes that pose significant environmental risks. Data reveal that Kentucky industries have reduced the generation of these 17 priority chemicals from 31.8 million pounds in 1987 to 12.7 million pounds in 1996—a 60% decline.

Toxic Chemical Spills. Each year millions of gallons of toxic and hazardous substances are accidentally spilled in the U.S. along transportation routes and at industrial sites. Industries and others

Toxics at a Glance

TRI* facilities reporting in Ky. (1996): 429

Generation of TRI chemicals (1996): 577 million lbs.

Release of TRI chemical to environment (1996): 47.4 million lbs.

Top counties with TRI releases (1996): Jefferson, Marshall, Woodford, Hancock, Simpson, Logan, Ballard, Scott

Top facilities releasing TRI chemicals (1996): DuPont, Koppers Ind., Air Products and Chemicals, Ford Motor Co., Elf Atochem, Toyota Motors, Osram Sylvania, Westvaco, American Synthetic Rubber, Imco.

Release of 17 priority toxics** (1996): 12.7 million lbs.

Reduction of 17 priority toxics (1988 to 1996): 60%

Hazardous material spills in Ky. (1998): 4,327

Screenings of children for lead poisoning (1998): 35,576 children with acute lead poisoning: 327 (1%)

children with blood lead levels of concern: 4,220 (12%)

Ag. pesticides sold in Ky. (1997): 9.34 million lbs.

Certified pesticide applicators: 59,190

Samples of Ky. produce tested for pesticides (1997): 118 samples with pesticide residues detected: 0

*Toxics Release Inventory - certain companies must report toxic chemical generation, transfers, and releases.

**17 TRI chemicals targeted for reduction by the U.S. EPA.

handling these materials are required to report spills and accidental releases to the state and other agencies. Spill incident notifications received by the Kentucky Department for Environmental Protection's Environmental Response Team have increased from one report a day in 1983 to 11 a day in 1998. The rise in reported spills is attributed to an increase in transportation activity due to a stronger economy, tightening of reporting requirements for leaking underground storage tanks and other sources, and greater awareness of reporting requirements.

Pesticides. Each year millions of pounds of pesticides are applied to farmlands, golf courses, highway and utility right-of-ways, and lawns. In Kentucky, an estimated 8.9 million pounds of pesticide products were sold for use on agricultural crops during 1997. Another 631,701 pounds were used on lawns according to records obtained from 286 lawn care companies, golf courses, and private right-of-way commercial applicators.

The use of agricultural chemicals has increased in recent years—a reflection of higher crop production levels. While various programs have been in place to promote the reduction of agricultural chemicals, trends show no significant decline in the use of agricultural chemicals in Kentucky. A state program to collect old agricultural pesticides has been underway since 1995. To date, 121,600 pounds of pesticides have been collected under this program.

Safe Food. Concerns about the safety of food supplies led to the passage of the federal Food Quality Protection Act of 1996. The act strengthens the system that regulates pesticide residues in food and includes greater protections for children.

The Kentucky Department for Public Health randomly tests produce for pesticide residues. During

1996 and 1997, 202 samples of Kentucky-grown produce were tested. One sample detected pesticide residues above the tolerance standard established to protect public health. Nationwide, 34% of the food tested had detectable pesticide residues, 1.4% above safe limits.

Lead Poisoning in Children. Though banned from gasoline and paint, lead remains a significant health risk to children. It is estimated that one in 11 children nationwide has high levels of lead in his/her blood. Lead is particularly harmful to a child's developing brain and nervous system, causing reading and learning disabilities, reduced attention span, decreased growth, and even brain damage. Lead-based paint in older homes has become the primary source of lead exposure for children.

During 1998, local health departments conducted 35,576 blood screenings of children under the age of six. The tests found that 327 children (1% of those tested) had lead levels high enough to cause severe health problems and 12% had levels of concern.

Challenges Ahead. Reducing the generation and release of toxic chemicals is critical if Kentucky is to minimize health and environmental threats. The need to set quantifiable reduction targets for toxic chemicals at the state and community level is among the challenges facing Kentucky. Many pollution prevention experts, including those at the Kentucky Pollution Prevention Center, also agree that incentives as well as disincentives are needed to encourage further reduction of toxic chemicals. The Pollution Prevention Center works with companies to find cost effective pollution prevention solutions. During FY 1997-98 the center trained 2,600 people and conducted 39 on-site pollution prevention assessments.

Potential Health and Environmental Effects of Top 5 TRI Chemicals Released (by Volume) to Kentucky's Environment

	Pounds (1996)	<i>acute</i>	<i>cancer</i>	<i>chronic</i>	<i>developmental</i>	<i>reproductive</i>	<i>neurotoxic</i>	<i>ecotoxic</i>	<i>smog</i>	<i>ozone depleter</i>
Methanol	5,203,904	x		x	x	x	x	x		
Xylene (mixed isomers)	4,479,586	x					x			
Chlorodifluoromethane	4,289,701	x			x	x	x			x
Toluene	3,948,228	x		x	x	x	x	x	x	
Creosote	3,454,889	x	x	x			x			

Acute toxicity: toxicity that results from a single exposure. Cancer: potential human carcinogenic effects based on current classification by U.S. EPA. Chronic toxicity: toxicity that results from repeated exposure over a long period. Developmental: causing fetal developmental defects. Reproductive: causing reduced fertility or infertility, miscarriages. Neurotoxic: effects to the nervous system. Ecotoxic-chemicals that are toxic to aquatic and terrestrial organisms, both natural and agricultural. Smog: ground-level ozone precursor. Ozone depleter: release linked to the thinning of the ozone layer. Source: Ky. DEP Risk Assessment Branch, Toxics Release Inventory Report, U.S. Agency for Toxic and Disease Registry, Federal Hazardous Substances Database